

What is claimed is:

1. A multi-wavelength light source,
comprising:

5 an optical pulse light source outputting an optical
pulse sequence;

an optical pulse shaping unit making a shape of
an optical pulse output from said optical pulse light
source into a super Gaussian pulse of a third order or
10 higher;

a spectrum expanding unit expanding a spectrum of
an optical pulse sequence composed of shaped optical
pulses; and

an optical splitting unit splitting the optical
15 pulse sequence the spectrum of which is expanded into
light beams of respective frequencies.

2. The multi-wavelength light source according
to claim 1, wherein

20 said spectrum expanding unit expands the spectrum
by using an optical fiber as a nonlinear medium.

3. The multi-wavelength light source according
to claim 1, wherein

25 said spectrum expanding unit expands the spectrum

by using a highly nonlinear fiber or a holey fiber as a nonlinear medium.

4. The multi-wavelength light source according to claim 1, wherein

said optical pulse shaping unit comprises
a wavelength splitter performing Fourier transform for the optical pulse sequence,
a spatial modulator controlling an intensity,
10 or an intensity and a phase of a Fourier component, and
a wavelength coupler coupling light beams for which spatial modulation is performed.

5. The multi-wavelength light source according to claim 4, wherein

said wavelength splitter and said wavelength coupler are a diffraction grating or an array waveguide grating filter.

6. A multi-wavelength light generating method, comprising:

outputting an optical pulse sequence;
making a shape of an optical pulse output from an optical pulse light source into a super Gaussian pulse
25 of a third order or higher;

expanding a spectrum of an optical pulse sequence
composed of shaped optical pulses; and

splitting the optical pulse sequence the spectrum
of which is expanded into light beams of respective
5 frequencies.

7. The multi-wavelength light generating
method according to claim 6, wherein

the spectrum is expanded by using an optical fiber
10 as a nonlinear medium in said spectrum expansion.

8. The multi-wavelength light generating
method according to claim 6, wherein

the spectrum is expanded by using a highly nonlinear
15 fiber or a holey fiber as a nonlinear medium in said
spectrum expansion.

9. The multi-wavelength light generating
method according to claim 6, wherein

20 said light pulse shaping comprises

performing Fourier transform for the optical
pulse sequence,

controlling an intensity, or an intensity
and a phase of a Fourier component, and

25 coupling light beams for which spatial

modulation is performed.

10. The multi-wavelength light generating method according to claim 9, wherein

5 a diffraction grating or an array waveguide grating filter is used in said Fourier transform performing and said coupling.